Claims

[c1] What is claimed is: 1. A method of source routing to implement device-to-device communications across a hybrid distributed device control network, said method comprising: a) orginating a packet at a source node; b) having the packet consist of sections including;

i)a header;

ii)a network path; and

iii)data.

[c2] c) encapsulating the packet in a protocol-specific packet used by the subnetwork of the source node; d) passing said protocol-specific packet to the first destination router in the network path;

e) having the router decapsulate the protocol-specific packet;

f) increment the next path destination index counter by one;

g) using the next path destination index counter to point to the next path destination address;

h) encapsulating the packet in a protocol-specific packet used by the next destination subnetwork; i) passing said protocol-specific packet to the next destination router in the network path; and

j) repeating the previous five steps until the packet reaches the final destination node.

[c3] 2. The method according to claim 1 wherein said encapsulation packet has an encapsulation header that contains a destination address.

[c4] 3. The method according to claim 1 wherein an acknowledgement is requested comprising the additional steps of:

k) orginating an acknowledgement packet at the destination node; l) having the acknowledgement packet consist of sections including;

i)a header;

ii)a network path; and

iii)data.

[c5] m) creating the acknowledgement network path by inversing the network path of the packet;

n) encapsulating the acknowledgement packet in a protocol-specific packet used by the subnetwork of the destination node; o) passing said protocol-specific packet to the first destination router in the acknowledgement network path;

p) having the router decapsulate the protocol-specific packet;

q) increment the next path destination index counter by one;

r) using the next path destination index counter to point to the next path destination address;

s) encapsulating the acknowledgement packet in a protocol-specific packet used by the destination address"s subnetwork; t) passing said protocol-specific packet to the next destination router in the network path; and

u) repeating the previous five steps until the acknowledgement packet reaches the source node.

[c6] 4. The method according to claim 1 wherein a packet is being broadcast to all the nodes in a subnetwork in which the additional steps of:

k) identifying the packet as a broadcast packet; and l) encapsulating the broadcast packet in a protocol-specific packet used by the destination subnetwork; and m) passing said broadcast packet to the nodes on the destination subnetwork.

[c7] 5. The method according to claim 1 wherein a packet is a multicast to the nodes in a specific subnetwork in which the additional steps of:

k) identifying the packet as a multicast packet; l) checking to see if the subnetwork supports multicasting;

m) encapsulating the multicast packet in a protocol-specific packet used by the subnetwork and pass said multicast packet to all of the nodes in the subnetwork if the subnetwork supports multicasting; and n) encapsulating the multicast packet in a protocol-specific packet used by the subnetwork and pass said multicast packet to the the nodes specified in the network address section of the packet, if the subnetwork does not support multicasting.

[c8] 6. The method according to claim 1 wherein said packet helder section contains the following fields:

a)Packet Type;

b)Packet ID;

c)Quality of Service;

d)Network Path Length;

e)Data Pointer;

f)Network Path Pointer Table;

g)Network Path Destination Index; and

h)Multicast Pointer.

[c9] 7 ~~6~~. The method according to claim 1 wherein said Network Path section contains the following fields:

a)Network Type; and

b)Network Address.

[c10] 8 ~~7~~. The method according to claim 1 wherein said Data section contains the following fields:

a)Data Length; and

b)Data Segment.